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List of water-supply works in rural areas sanctioned for execution out of the Government of India grant—cont.

Serial number and name of work.								Amount of estimate.
								RS.
26. Vizagapatam District Board—cont.								
Veeravalli taluk.								
27	Constructing a well at	Konan	..	..	..	..	..	500
28	Do.	Thurakulapudi	..	..	..	..	..	500
29	Do.	Narasimha Gajapatinagaram	..	..	..	..	..	450
30	Do.	Thotakurapalem	..	..	..	..	..	450
31	Do.	Madgole	..	..	..	..	..	500
32	Do.	Butchayyapeta	..	..	..	..	..	470
33	Do.	Gangavaram	..	..	..	..	..	500
Bimlipatam taluk.								
34	Constructing a well at	Mopada	..	..	..	..	..	480
35	Do.	Konada	..	..	..	..	..	600
36	Do.	Mopada tank	..	..	..	..	..	610
37	Do.	Thallavalasa	..	..	..	..	..	450
Total								18,000

APPENDIX VI.

[Vide answer to question No. 459 asked by Mr. K. A. Nachiyappa Gounder at the meeting of the Legislative Council held on the 5th November 1935, page 595 supra.]

APPENDIX I.

Statement showing the schemes of research financed by the Imperial Council of Agricultural Research and the amount of grant for each.

	RS.
1 Scheme of research on rice	1,15,660
2 Scheme of seed potatoes	19,965
3 Scheme of sugarcane	1,50,100
4 Scheme of fruits	66,064
5 Dry farming scheme	1,39,510
6 Scheme for investigation into the chemistry of malting cholam	11,656
7 Scheme for extension of work on animal nutrition	49,930
8 Marketing scheme	99,015
9 Economic enquiry scheme	52,290
10 Appointment of veterinary investigation officer	50,000

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APPENDIX II.

Scheme of research on rice.

The conditions of rice growing in the different parts of the province vary very much, each tract having its own special set of varieties. It was realized early enough that the improved strains evolved at any centre had only a limited scope, and so the expansion of the work of the Paddy Specialist at Coimbatore took the shape of the opening of a number of sub-stations, one in each of the important tracts. The first such station was opened in Aduturai in 1921 for Tanjore and this was followed by Maruteru in 1925 for Godavari, and Pattambi in 1926 for Malabar and South Kanara. The idea was to open the next station in Ganjam district which was an important rice tract. Owing to the financial stringency, the scheme did not materialize until 1932 when the Imperial Council of Agricultural Research undertook to finance research schemes on rice in the different provinces in India. The grant made by the Imperial Council of Agricultural Research to Madras was utilized for starting a station in Ganjam.

Since the scheme was a temporary one for five years only, a block of about 32 acres of wet lands was taken on lease in Berhampur which was considered an ideal centre for this work.

The land was actually taken over in March 1932 and preliminary to that cultivation season, small and inexpensive buildings to be used as laboratory and seed store, a temporary cattle-shed, etc., were put up. We have just finished three seasons' work in the station and the crop is just being planted for the fourth season.

The work on the station falls under the following items:—

- (a) Production of improved strains of the local rice varieties;
- (b) a rice survey of the tract, collection of varieties, the isolation of pure types, their description and maintenance;
- (c) devoting attention to the general genetics of the rice plant especially to the clearing up of obscure points in connexion with the inheritance of characters; and
- (d) cultural and manurial experiments with the local varieties.

1. *Evolution of strains.*—This is the most important of the four and greater attention has therefore been paid to this aspect of work. Preliminary to evolving single-plant selections which takes time, mass selected bulks of two of the most important local varieties, namely, *byyakhunda* and *ratnachudi*, have been obtained and distributed to the people during the last two seasons. The ryots who have grown this have expressed high satisfaction in the performance of these and about 8,000 lb. of such seed was distributed this year. Meanwhile over 1,900 single-plant selections were made in half of a dozen of the most widely cultivated varieties of the tract and the best of these have finished one year of regular yield trials on the station. A large number of them have given definite increased yields over the local seed, the increases varying from 10 to 25 per cent. The trials will be repeated for another season on the station and the most outstanding of these will also have

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to be tried in the district at a few selected centres in the final year of the scheme. A good number of selections in the fine riced varieties which are not grown so widely have also been made. Trials with strains evolved elsewhere have also shown that strain GEB. 24 of Coimbatore compares very favourably with the best of the local varieties in point of yield and grain quality.

2. *Rice survey*.—A rice survey of the Ganjam district and the northern portion of the Vizagapatam district has been made. About 160 morphologically distinct varieties have been collected including some interesting wild types. Type plants in all the varieties collected have been isolated and their description recorded.

3. *Hybridization*.—Under this head several crosses have been made (1) with regard to the study of the inheritance of rice colour, glume colour and texture of rice and (2) evolving superior types synthesising valuable characteristics from different varieties into one.

4. *Cultural and manurial experiments*.—The several cultural experiments that have been in progress during the three seasons relate to broadcasting versus transplanting, different spacings under manured and unmanured conditions, the optimum age of seedlings to be planted and different rates of sowing seed-bed, etc. Valuable results have already been obtained with regard to these experiments. While transplanting is in general better than broadcasting for rice, under Berhampur conditions with normal season, broadcasting is found to be just as good as transplanting. The optimum spacing for this tract is found to be within six inches per plant and there is also found no advantage in planting more than one seedling to a hole. With regard to age of seedlings, 50 days appear to be the limit beyond which the yield suffers. As in other tracts the importance of sowing seed-beds thin has been established for Berhampur also.

The manurial experiments relate to the trials of green manuring, trial of phosphates like super or bonemeal with green leaf, supplementing leaf with concentrated manures, and the efficacy of lime dressing. The value of green manuring has been well emphasized, an application of even 2,000 lb. giving an increase of 15 per cent in grain yield. There is also a progressive increase in the grain yield as the leaf dose is increased from 2,000 to 6,000 lb. While green manuring is found to be economical, additions of phosphates or concentrated compound manures like ammo-phos, though they do increase the yield still further, the value of the extra yield obtained does not cover the cost of the manure. Some definite results on manuring problems of this tract are expected to be available by the time the five-year period is finished.

Scheme for research on seed potatoes.

The work commenced from June 1933.

The main object of the work is to evolve new superior varieties from seedlings obtained from true seeds, that will be compatible with the Nilgiris conditions and disease resistance. The suitable type of variety for the Nilgiris is one that will mature within three months, resist

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early blight (*alternaria*) and frost and give heavy yields. The necessity for the early maturing variety for the Nilgiris is most pressing as will be seen from the following (vide annexure).

2. There are 44 varieties grown in the farm and a detailed study of the botanical characters of these was made and a list of varieties that produce and retain flowers and those that bear viable pollen has been worked out. The varieties and their flower characters are given in Table No. 1.

3. *Hybridization work*.—Both crossing and reciprocal crossing of all the flowering varieties were done. So far seven successful crosses have been obtained. The number of varieties used in crossing and the number of berries gathered are given in Table No. 2.

4. *Vitality of seed and raising of seedlings*.—The naturally set seeds as well as the crossed seeds were sown in well prepared seed pans. The germination of the crossed seeds and the vigour of the seedlings obtained from them was better than those of the selfed seeds. Five thousand four hundred and thirty-four seeds were sown, 1,245 seedlings were obtained, 16 plants gave tubers, and 500 plants are surviving with tubers developed in them. They are awaiting further study and selection of suitable type for cultivation. It is hoped that some of them may prove better than the existing varieties and a few may even be fit for cultivation in the plain. One F_2 progeny and thirteen F_1 progenies of seedling potatoes were planted and are growing.

5. *Seasonal sowing*.—To find out the best time of sowing to get the best results, it was proposed to sow the Coonoor white seeds by the beginning of every month and sowing was commenced from January. The number of seeds sown in months and the seedlings obtained are given in Table No. 3.

6. *New varieties*.—A Russian variety of potato seed (*Sol. neoantipoviczii*)^{*} was sown on 19th March 1935. This variety is resistant to phytophthora and rich in Vitamin C. One hundred and fifty seeds were sown, 75 seeds germinated and 55 seedlings are surviving and have formed tubers.

* 7. *Identification of varieties*.—A considerable amount of attention was paid to checking the varieties being grown and their purity. The varieties Alnwick Castle and Adirondack were classified as Royal kidney and Catriona respectively.

8. *Flower studies*.—A detailed floral study with regard to the age of bud, time of opening of corolla, maturation period of berries, time of receptivity of the stigma, time of dehiscence of anthers, critical period of bud shedding, berries, etc., is underway. It is found that corolla begins to open from 6 a.m. in the morning and the opening is completed by 10 a.m. majority of the flowers opening at 8 a.m. In the evening at about 4 p.m. the petals close and the flowers droop and open again next morning and stand erect. The corolla begins to fade from the

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fourth day and if berries are not set the whole flower sheds on the 7th or 8th day. If the berries are set, the corolla alone drops down. The anthers burst on the 2nd and 3rd day after opening of the flower.

9. *Leaf studies*.—This was started in the irrigated crop this year to see if any correlation exists between the age of the leaf and yield of potatoes so as to enable selections to be made from the leaf study alone without waiting for the harvest of the tubers.

10. *Forcing flower production*.—Most of the varieties produce flower buds but the buds shed at a very early stage or at various stages of development. To induce them to mature and open their blossom and to retain them for crossing, the following treatments were made:—(1) Removing of tubers as and when forming; (2) strangulating with thin copper wire the top internode of the haulms; (3) growing the plants with different nutrient solutions; (4) injecting the seed tubers with different nutrient substances. All of these proved unsuccessful.

11. *Purity of stock and hill selection*.—Roguing of the varieties and selection of a few vigorous and disease-free hills from the standard varieties to keep the stamina and purity of the stock is being carried out.

12. *Vegetative mutants*.—Any coloured tuber-bearing variety of potatoes is at a discount in India generally and particularly in the Nilgiris. But some of these are not only good yielders but also have good cooking qualities. Vegetative mutants occur by the removal of eye buds by which the new buds develop from deeper layers which do not possess the colour bearing qualities of the original tuber and a white coloured tuber is obtained. A variety 'Golden Wonder' which has a dark brown russety skin, on treatment in the above manner gave white smooth skinned tubers.

Table No. 1

Serial number and name of the variety.	Flowers abundant or few.	Regular or occasional flowering.	Viable pollen present or not.	Remarks.
1 Advancer	Few ..	Occasional ..	Not present ..	Used as mother parent.
2 Ally	Do. ..	Do. ..	Do. ..	....
3 Arran Banner	Nil. ..	....	....	....
4 Arran Comrade	Few ..	Occasional ..	Not present ..	Used as mother parent.
5 Arran Crest .. ..	....	....	....	Drop in buds.
6 Arran Scout .. ..	....	....	....	Do.
7 Arran Victory	Few ..	Occasional ..	Not present ..	Used as motherparent.
8 Bencruachan	Nil ..	Occasional ..	Present ..	Drop in buds.
9 Bishop	Abundant ..	Occasional ..	Present ..	Used as father and mother parent.
10 Blue flower	Few ..	Do. ..	Not present ..	Used as mother parent.
11 Catriona	Abundant ..	Do. ..	Do. ..	Do.
12 Cawnpore	Do. ..	Regular ..	Present ..	Used as father and mother parent.
13 Climax	Few ..	Occasional ..	Do. ..	Used as mother and father parent.
14 Coonoor white	Abundant ..	Regular ..	Do. ..	Do.
15 Coonoor red	Do. ..	Do. ..	Do. ..	Do.
16 Divernon	Few ..	Occasional ..	Not present ..	....
17 Duke of York	Do. ..	Do. ..	Do. ..	....
18 Early market	Do. ..	Regular ..	Do. ..	Used as mother parent.
19 Eclipse	Abundant ..	Occasional ..	Do. ..	Do.
20 Epicure	Few ..	Do. ..	Do. ..	....
21 Evergood	Do. ..	Do. ..	Do. ..	Used as mother parent
22 Factor	Abundant ..	Do. ..	Do. ..	Do.
23 Garhwal	Do. ..	Do. ..	Present ..	Used as father and mother parent.
24 Golden wonder	Do. ..	Regular ..	Do. ..	Do.

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Serial number and name of the variety.	Flowers abundant or few.	Regular or occasional flowering.	Viable pollen, present or not.	Remarks.
25 Great Scot	Few	Occasional ..	Not present ..	Used as mother parent.
26 Herald	Do.	Do.	Do. .. ..	....
27 Italian	Do.	Do.	Do. .. ..	....
28 Kerr's Pink	Abundant ..	Regular	Not present ..	Used as mother parent.
29 Khabrat	Few	Occasional ..	Do.	Do.
30 King Edward	Abundant ..	Regular	Do.	Do.
31 Latecarman	Do.	Do.	Present	Used as father and mother parent.
32 Lord Tennison	Few	Occasional ..	Do.	Do.
33 Majestic	Do.	Do.	Do.	Do.
34 May Queen	Do.	Do.	Do. .. ..	....
35 Poona	Do.	Do.	Not present ..	Used as mother parent.
36 President	Abundant ..	Regular	Present	Used as father and mother parent.
37 Royal Kidney	Nil	Do.	Do.	Drop in buds.
38 Sharpe's Express	Abundant ..	Occasional ..	Not present ..	....
39 Talisman	Do.	Regular	Present	Used as father and mother parent.
40 Up-to-date	Do.	Do.	Do.	Do.
41 Windsor Castle	Few	Occasional ..	Do.	Do.
42 Witchhill Early	Do.	Do.	Not present ..	Used as mother parent.
43 White City	Do.	Do.	Do. .. ..	....
44 Langworthy	Do.	Do.	Do.	Mutant obtained from Golden Wonder, Botanical Character under study.

Table No. 2.

Season.	Total number of varieties used in crossing.	Number of flowers crossed.	Number of berries set.
Main crop, 1933-34	6	605	161
Second crop, 1933-34	2	21	..
Irrigated crop, 1934-35	13	232	107
Main crop, 1934-35	18	1,621	36
Second crop, 1934-35	10	243	..
Irrigated crop, 1935-36	4	1,097	18
Main crop, 1935-36	22	2,188	31
Grand total	..	6,057	353

Table No. 3.

Month.	Number of seeds sown.	Number germinated.	Percentage of germination.
January	100	23	23
February	100	19	19
March	100	11	11
April	100	47	47
May	100	39	39
June	100	49	49
July	100	36	Germination not complete.

Variety Coonoor White.

ANNEXURE.

The necessity for an early maturing variety.

Three crops are grown in the Nilgiris in a year. The main crop which is extensively cultivated is planted in March-April and harvested in August-September. The second crop is grown between August and December. A third crop under irrigation on a very small scale is raised between February and May.

It takes roughly 2-3 months to bring potatoes after harvest into suitable condition for planting. Second crop easily supplies seed for main crop. But considerable difficulty is felt in obtaining seed in sufficient quantity to plant large areas under second crop, as the harvest of the main crop and planting of

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the second crop overlaps, so the planting of the second crop is very often delayed to the end of September or beginning of October running great risks for lack of sufficient moisture at the end of the north-east monsoon—period in December and also increasing the risk of frost damage before the tubers have come to a usable size. Either the area under irrigated crop should be increased by the utilization of suitable irrigation sources or the seed from the previous second crop should be kept over a period of 7-8 months. During this long period, even with such precautions as can be taken the loss is very heavy and in addition 7-8 months seed generally gives a poorer yield than seed 2-3 months old. The other alternative is to raise a short duration variety that will mature within three months so that the main crop planted in March-April will be ready by the end of June or beginning of July, when the seeds obtained from this crop will be fit for planting in the middle of August or beginning of September.

The Dry-Farming Scheme at Hagari.

With the financial aid of the Imperial Council of Agricultural Research, the Dry Farming Scheme for the Ceded districts at the Hagari Agricultural Research Station was actually begun from the 14th April 1934. During the one year that has passed it was not possible to take up all that was proposed. Some time elapsed by the time the buildings and other equipment were fixed. The laboratory and pot culture equipment is not yet complete, hence the Soil Physicist continues to work at Coimbatore on soil samples taken periodically from Hagari.

2. Preliminary to the Scheme, 8 years ago, an experiment was laid out to study the effect of different cultural treatments on the moisture conservation and on the physical properties of the soil. Till last year only crop values from these plots were obtained and the results were not complete without an insight into the moisture and other physical conditions of these plots. With the extra staff provided on the scheme it was possible to take soil samples thrice; (a) once before sowing to know what the crop starts with; (b) again when the sorghum crop was in flower, i.e., when growth is almost complete and (c) after the crop was harvested to know what the crop has utilized. The one season study has not given any specific results and it is too early to expect differences in these plots. Being a research on fundamentals we have to continue this for some years.

3. The good indications from these experimental plots were tried on a large scale. In years of low rainfall the putting up of bunds was advantageous. Last year severe drought prevailed and by bunding with a crop of cotton a significant increase of 51 per cent yield was obtained. In this season this is being put to test outside the station in four places of varying soil conditions.

4. With the help of the staff intended for the improvement of millets, sorghum and Italian millet, 130 villages of the Bellary and Alur taluks of the Bellary district were visited. The local Agricultural practices were enquired into, and 242 sorghum samples and 201 of Italian millets were collected and sown. The season was adverse to the Italian millet and was slightly better for sorghum. The poor ones have been eliminated and only fairly promising yielders have been retained. The selection K-23 of Italian millet is very promising and in 1936-37 may go out into the district trials.

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5. In obedience to the recommendations of the Dry Farming Research Co-ordination Committee findings, what has been good or promising in one tract is being tried in all the other Dry Farming stations. The "Bombay Dry Farming method" which consists of ploughing, harrowing about five or six times before sowing, bunding the area and sowing wider than their local practice in rows 18 inches apart has produced about 50 per cent more yield in that tract. This was tried at Hagari but was not so advantageous. In the arid tracts of the United States of America alternate year cropping has produced good results. This is also being tried at this station on a small scale. In the next season the value of the last year fallow will be known.

6. The laboratory equipment and the full strength of the staff may be available this crop season when the full programme of research proposed will be taken up.

Scheme of Economic Enquiry into the cost of production of crops in the principal sugarcane and cotton tracts of India—Madras Presidency.

In considering the question of the cost of production of sugarcane, the Sugar Committee of the Imperial Council of Agricultural Research came to the conclusion that the results of such an enquiry would be of value to the Council by enabling it to decide in what areas the sugarcane industry had the best prospects of development and in what places and in what manner funds for research and experimental work could best be allotted. The Indian Central Cotton Committee similarly decided that an enquiry of this kind should include cotton as there was no data as to the exact cost of producing an acre of cotton and rotation crops with it and recommended the proposal for the acceptance of the Imperial Council of Agricultural Research. The Imperial Council of Agricultural Research accordingly considered these recommendations and sanctioned the scheme of Economic Enquiry for three crop years from 1933 in 11 provinces including Madras and Indian States. The scheme is intended to investigate the cost of production of cotton, sugarcane and rotation crops, with the object of arriving at some general data, as accurate as circumstances would permit, on the actual cost of production of all main crops, whether and what crops would yield some reasonable source of living to the man who actually tilled the soil and how the cost compares with the cost of production in other countries.

2. The details of the scheme were then worked out by the Chief Economist of the Imperial Council of Agricultural Research; he is responsible for the collection of data in proper form. The Headquarters Deputy Director of Agriculture, Madras, is the provincial officer in charge of the Enquiry for the Madras Presidency. The preliminary details and procedure regarding forms of accounting and duties, etc., of the district and village staff were settled at a Conference of all Provincial Officers in Nagpur in March 1933 at which the Headquarters Deputy Director of Agriculture was present.

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3. The enquiry in Madras was commenced in April 1933. It is conducted in the three districts of Vizagapatam, Bellary and Coimbatore. Each district is in charge of a District Supervisor deputed from the Upper Subordinate Service of the Madras Agricultural Department. Six typical villages in each district and 8 holdings in each village are under investigation. A village investigator is stationed in each village whose duty it is to record daily all facts concerning the holdings in the village in his books. The District Supervisor visits each village whose duty it is to record daily all facts concerning the the Investigators, makes other enquiries of the owners of the holdings and posts the necessary figures in the Supervisors' books. Any doubts which are matters of minor detail, arising from the instructions given and in the forms supplied to the Investigators and Supervisors, are cleared by the Provincial Officer himself or in consultation with the Chief Economist. A list of the villages where select holdings are under investigation is furnished in the annexure.

4. The forms for the enquiry are supplied by the Imperial Council of Agricultural Research in printed books and loose sheets. These cover all receipts, expenditure, cash or in kind, hired, exchange and family labour—both for bullock and human—, rents, rates, cesses, etc. The crop ledger is the concluding part of the enquiry. This gives an idea of the cost of production and income per acre, and per maund of the produce from each crop. The ledgers for the first crop year 1933-34 are now complete. Of 726 ledgers for the 3 districts, 527 have been checked by a special staff of two Village Investigators stationed at Madras and sanctioned by the Imperial Council of Agricultural Research for the purpose, and 377 sent to the Chief Economist, Imperial Council of Agricultural Research. The rest are under check. The ledgers for the second-crop year 1934-35 are under preparation by the District Supervisors and are expected to be ready in three or four months' time. The enquiry is now going on for the third-crop year.

5. The data collected for first-crop year can be considered only as tentative.

ANNEXURE.

Economic Enquiry Scheme—List of villages under investigation.

Serial number and district.	Taluk.	Village.	Main crop.	Date on which the village investigator started enquiry.
1 Vizagapatam.	..	Viravilli	Pakirsahibpetta.	Sugarcane .. 8th April 1933.
		Anakapalle	Thummapala ..	Do. .. Do.
		Parvatipur	Pedabondapalli.	Do. .. 19th April 1933.
		Golgonda	Balighattam ..	Cotton .. 15th April 1933.
		Palkonda	Bhurja ..	Sugarcane .. 8th April 1933.
		Golgonda	Chettipalli	Do. .. Do.
		Siruguppa	Siruguppa ..	Sugarcane .. 1st May 1933.
		Hospet	Mudlapuram ..	Do. .. 8th April 1933.
2 Bellary	..	Do.	Kampli ..	Do. .. Do.
		Bellary	Yalpakagga ..	Cotton .. 1st June 1933.
		Alur ..	Bantanahal ..	Do. .. 30th May 1933.
		Adoni	Harivanam ..	Do. .. 26th May 1933.

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Serial number and district.	Taluk.	Village.	Main crop.	Date on which the village investigator started enquiry.
3 Coimbatore ..	Coimbatore ..	Vellakinar ..	Sugarcane ..	8th April 1933.
	Udamalpet ..	Budinatham ..	Do. ..	15th May 1933.
	Palladam ..	Perumanallur ..	Irrigated cotton.	8th April 1933.
	Avanashi ..	Annur ..	Do. ..	20th April 1933.
	Coimbatore ..	Athipalayam ..	Dry cotton ..	10th June 1933.
	Udamalpet ..	Anthiyur ..	Do. ..	30th June 1933.

A BRIEF NOTE ON THE WORK SO FAR DONE ON THE "SCHEME OF RESEARCH ON SUGARCANE" FINANCED BY THE IMPERIAL COUNCIL OF AGRICULTURAL RESEARCH.

The scheme was sanctioned by the Imperial Council of Agricultural Research for a period of five years from 1932-33, and came into operation in the beginning of 1933-34. It was proposed to utilize this grant to extend further the intensive work carried on at the Anakapalle Agricultural Station in Vizagapatam district, and to start a new sub-station at Gudiyattam in North Arcot district to meet the demands of the central districts.

The research work at the Anakapalle Agricultural Station was directed on the following aspects:—

- (i) The improvement of the crop from all aspects with a view to reduce the cost of cultivation, increase the yield and effect improvement in the manufacture of jaggery;
- (ii) the extension of the crop into areas, where the cultivation of sugarcane is not ordinarily possible or where less paying crops are now being grown.

To meet these objects, varietal, cultural and manurial experiments were being tried under a great variety of conditions to meet the requirements of dry and garden land. With the additional staff from the grant of the Imperial Council of Agricultural Research, the work was intensified and strengthened in all directions.

Varietal Trials.

Varieties.—Irrigation being an important limiting factor in the cultivation of sugarcane, varietal trials were laid down giving the varieties full and restricted irrigation, and at different periods, so as to meet the demands of varying water-supply. It has been possible from this to isolate types which are very drought-resistant and which can stand water-logging. As a result of work at the station, the area of sugarcane in the Kistna Delta with limited irrigation has increased from small beginnings to 7,000 acres at present, mainly under one strain, Co. 213, and further research is in progress to isolate types

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which are not only more drought-resistant, but which will also prolong the period of cane crushing in areas where factories have already started.

Sorghum Sugarcane hybrids.—In this connexion, seven hybrids from the Imperial Sugarcane Expert were under regular study, under varying water-supply. Although they are slightly early to mature and resistant to drought, they are not able to compete in tonnage with other promising varieties as Co. 213, P.O.J. 2878 at the farm. The economic possibilities of growing mixed varieties like early and late varieties, lodging and non-lodging varieties, to combine different qualities is also under investigation.

Cultural Experiments.

Irrigation.—The experiments in irrigation are being conducted not only to test the requirement of different varieties but also to find out the effect of spacing, manuring, and period of water-supply on it. Irrigation during the cold weather was found to have no advantage over “no irrigation” plots, but hot weather irrigation hastened maturity.

Spacing.—A very detailed study is being made in connexion with spacing and its relation to varieties, irrigation and manure. Previous work showed that in wider spacing there is a saving of 20 per cent in seed material and corresponding saving in wrapping, propping and cultural operations. The present trials have been instituted to investigate further economies with restricted irrigation in the cane crop.

Time of planting.—The experiments showed that there are two periods of planting, one from February to April and another from September to November. Plantings at other times gave low tonnage. It is found that by a suitable adjustment of varieties and cultural operations, the crushing of cane may be commenced as early as the middle of November and continued till May.

Raising of canes on dry land.—The object of the experiment is to try the possibilities of a drought-resistant cane on dry lands in parts of the Ganjam and Vizagapatam districts, where the practice is to raise a nursery and plant in the field later. The results show that drought-resistant types do very well under such conditions and further investigation is in progress in the direction of saving of costs in raising and planting a nursery crop.

Wrapping and propping.—These form the most costly items in sugarcane cultivation in the Circars, the expenses ranging from Rs. 150 to Rs. 200 per acre. The need for experiments in this direction has been recommended by the Sugar Committee. Experiments were laid down to study the effect of wrapping in relation to growth, quality of juice, nature of seed material used and to study cheaper methods of wrapping and propping. The results show that the elaborate processes of wrapping and propping are not economical especially for canes of the type of Co. 213. A considerable saving of

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costs can therefore be effected in this connexion. As a matter of fact, from a study of growth rate of cane, the number of wrappings has been reduced from a maximum of seven to a minimum of two at the agricultural station.

Manurial Trials.

Artificial.—Increasing doses of nitrogen, varying from 25 lb. to 100 lb. per acre were under investigation. It was found that increased doses gave increased yields in adverse seasons, but not in favourable ones. The effect of different combinations of Nitrogen, phosphoric acid and potash is also being studied with and without organic manures. The results so far are in favour of a complete manure in the non-organic plots, and further investigations are in progress.

Molasses.—One of the uses to which molasses from factories can be put to is in the form of manure for the cane crop. It was found that Molasses gave nearly as good yields as oil cakes, ammonium sulphate or green manure while chemical tests showed that the quality of the juice was unaffected.

Effect of manures on the quality of seed.—Investigations in cereals showed that the seeds from manured plots have a high cropping power and an experiment was therefore laid at Anakapalle to investigate such effects on the cane crop. The general trend of the experiment is that seed-canes obtained from an intensively manured plot germinated and yielded better than that from a poorly fertilised one, while in addition, the former required less manure in the planted field. The experiment continues.

The field experimental work at the station is supplemented by intensive chemical studies. The quality of the cane juice, its maturity and deterioration have been investigated in respect of a number of varieties and these have been classified under different heads to meet varied requirements of soil, and season. Researches are also in progress in respect of germination capacity, tonnage, length of millable cane, growth rates, girth, flowering, percentage of extraction and other economic characters.

The sub-station at Gudiyattam was started only in February last. Work done here consisted mainly in the laying out of the farm, the construction of buildings and fencing, etc. Four acres of land were planted with sugarcane in April 1935 and varietal, cultural and manurial trials have been undertaken and are in progress.

A brief note on the scheme for the appointment of Veterinary Investigation Officer in Madras.

The scheme was sanctioned by the Imperial Council of Agricultural Research for a period of five years from 1933-34 and the Veterinary Investigation Officer of this Province after a preliminary training of six months at the Imperial Institute of Veterinary Research, Muktesar, commenced his regular work from January 1934. The object of the

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scheme is to make precise and exhaustive investigation of the most important causes of ill-health, stunted development, and mortality found to exist in the province.

The following are some of the diseases for investigation:—

- (1) Rinderpest.
- (2) Hæmorrhagic Septicæmia, Blackquarter, Anthrax and Foot and Mouth Disease, including an examination of the practicability of better methods of control, viz., Chemotherapy in Foot and Mouth Disease, Bacteriophage in Hæmorrhagic Septicæmia, etc.
- (3) Trypanosomiasis—
 - (a) Equine
 - (b) Bovine
 } and possibilities of eradication.
- (4) Theilariasis.
- (5) Tuberculosis (Bovine)—its incidence in the province and its relation to public health, e.g., clean milk in municipalities, control of slaughter-houses, etc.
- (6) Sterility in cattle, including an investigation into contagious abortion and its prevalence, its causes and its relation to public health (undulant fever in man, etc.).
- (7) Deficiency diseases—in relation to dietetic as well as genetic factors (Osteoporosis, non-sweating, kumri, Hæmaturia, loose horns, etc.).
- (8) Sheep pox and contagious pneumonia in sheep and goats, their prevalence, mortality and possible methods of control.
- (9) Parasitism (worm infestation) including warbles, ticks, etc., and methods of eradication.
- (10) Rabies—its control and prophylaxis—one dose vaccine.
- (11) Bovine lymphangitis.

2. During 1933–34 after return from Muktesar the Investigation Officer took up first experiments on the use of goat virus in immunizing cattle against rinderpest and arranged for inoculation camps in Anantapur, Chittoor and Tanjore districts. The vaccinations conducted in these districts by him afforded some useful results and sufficient data which were recorded. In addition to the above work he also attended to the investigation of cases of ringworm which occurred at the Government Livestock Research Station, Hosur, and also to a few outbreaks of pseudo-fowl pest and fowl-pox met with during the course of his tours. He tried different methods of treatment for these diseases and recorded his observations.

3. During 1934–35 Blackquarter was taken up as the main object for investigation. Preliminary investigation was also undertaken on the following diseases:—

- (a) Bacterial diseases—
 - (1) Johne's disease.
 - (2) Tuberculosis.
 - (3) Anthrax.
 - (4) Bovine Lymphangitis.

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- (b) Virus diseases—
 - (1) Rabies.
 - (2) Sheep-pox.
 - (3) Contagious Pleuro-pneumonia.
 - (4) Fowl-pox.
- (c) Protozoan diseases—
 - (1) Theileria mutans.
 - (2) B. sergenti in sheep and goats.
 - (3) B bigeminum.
- (d) Fungoid diseases—
 - (1) Ringworm.
- (e) Parasitic diseases—
 - (1) Nasal granuloma.
- (f) Deficiency diseases—
 - (1) Chronic rhematic arthritides.
- (g) Poisoning.

APPENDIX VII.

[Vide answer to question No. 460 asked by Mr. K. A. Nachiyappa Gounder at the meeting of the Legislative Council held on the 5th November 1935, page 596 supra.]

G.O. Ms. No. 1043, Development, dated 29th August 1933

READ—the following papers:—

From the Collector of Salem, R.O.C. No. 3603/31, dated
1st April 1933.

To the Collector of Salem, No. 1345-III/33-2, dated
10th May 1933.

From the Collector of Salem, D. No. 3603/31, dated 21st June 1933.

Order—Ms. No. 1043, Development, dated 29th August 1933.

The Government do not consider that the lands required by the Salem District Urban Bank should be acquired under the Land Acquisition Act, 1894, as subsequently amended.

(By order of the Government, Ministry of Public Works)

C. A. HENDERSON,
Secretary to Government.

To the Collector of Salem (with draft notification under section 4 (1) returned).
,, Registrar of Co-operative Societies (with copy of Collector's letter).